

## WHAT IS CLAIMED IS

- 1) A damping support device for an exercise apparatus, in which the apparatus comprises a moving part (2) and a fixed support member (3), the moving part (2) performing movements, towards or away from the fixed support member, correlated with the exchange of forces between the user and the apparatus; the device (1) comprising supporting means (4) with at least one elastic element (5) positioned between the moving part (2) and the fixed support member (3); means (6) for damping the movements of the moving part (2) relative to the support member (3); wherein the damping means (6) of the device (1) comprise at least one magnetic actuator (8) with a first, moving component (9), integral with the moving part (2) of the apparatus, and a second, fixed component (10), integral with the relative support member (3); either (9; 10) the first component (9) or the second component (10) of the actuator (8) having an electroconductive element (11) designed to be the seat of an electromotive force, the other component (9; 10) comprising a permanent magnet (12) and a non-permanent magnet (13),

connected to one another in such a way as to form at least one air gap (14) designed to radiate a magnetic field passing through the electroconductive element (11); electrical energizing of the electroconductive element (11) producing a reactive magnetic force which, when applied to the moving part of the first component (9) and of the second component (10), counteracts its translation in the direction (15) of the movements of the moving part (2) of the apparatus.

- 2) The device according to claim 1, wherein the electroconductive element (11) is the seat of an electromotive force induced in it by the movement of the first component (9).
- 3) The device according to claim 1 or 2, wherein the electroconductive element (11) is a core (40) of the first, moving component (9).
- 4) The device according to claim 1 or 2, wherein the electroconductive element (11) is an electroconductive coil (11).
- 5) The device according to claim 4, wherein the electroconductive element (11) is powered by an

electrical generator.

- 6) The device according to claim 1, wherein the damping means (6) are arranged parallel with the supporting means (4).
- 7) The device according to any of the foregoing claims and comprising means (7) for adjusting the degree of damping, wherein the adjusting means (7) control the degree of damping by varying the size of the air gap (14).
- 8) The device according to claim 7, wherein the adjusting means (7) control the degree of device (1) damping by adjusting at least one of the coil (11) electrical energizing parameters.
- 9) The device according to claim 8, wherein the adjusting means (7) control the degree of damping by varying the coil (11) electrical resistance.
- 10) The device according to claim 8 or 9, wherein the adjusting means (7) control the degree of damping by varying the number of loops (28) in the coil (11).

- 11) The device according to any of the foregoing claims, wherein the adjusting means (7) are sensitive to the forces exchanged between the user and the apparatus, electrical energizing of the coil (11) being adjusted according to the forces exchanged between the user and the apparatus.
- 12) The device according to claim 11, wherein the adjusting means (7) are sensitive to at least a force proportional to the weight of the user.
- 13) The device according to claim 11, wherein the adjusting means (7) are sensitive to at least a force proportional to the speed of the sliding belt (22).
- 14) The device according to claim 1 or 8, wherein the adjusting means (7) are sensitive to the current relative position of the moving part (2) and the support member (3), the adjusting means (7) being designed to vary electrical energizing of the coil (11) according to the relative position.
- 15) The device according to claim 1 or 8, wherein the adjusting means (7) are sensitive to the forces exchanged between the user and the apparatus and

to the relative position of the moving part (2) and the support member (3); the adjusting means (7) being designed to vary electrical energizing of the coil (11) according to the forces exchanged between the user and the exercise apparatus and according to the current, relative position of the moving part (2) and the support member (3).

- 16) The device according to any of the foregoing claims, wherein the adjusting means (7) are designed to control electrical energizing of the coil (11) by control and management of an electrical voltage applied to it.
- 17) The device according to claim 1, wherein the electroconductive element (11) is connected to the first component (9) of the actuator (8) which moves together with the moving part (2) of the exercise apparatus.
- 18) The device according to claim 17, wherein the first, moving component (9) of the actuator (8) is adjacent to at least two air gaps (14) which, with reference to the direction of movement (15) of the first component (9), are reciprocally and longitudinally consecutive.

- 19) The device according to claim 1, wherein the electroconductive element or elements (11) are connected to the second component (10) of the actuator (8), the latter being integral with the support member (3), the one or more permanent magnets (12) being connected to the first, moving component (9) of the magnetic actuator (8).
- 20) The device according to any of the foregoing claims, wherein the moving part (2) is designed in such a way that it forms a rest for supporting the user of the exercise apparatus.
- 21) The device according to claim 20, wherein the moving part (2) includes a platform (16).
- 22) The device according to claim 20, wherein the moving part (2) includes a surface (17).
- 23) The device according to claim 20, wherein the moving part (2) includes a seat cushion (18).
- 24) The device according to claim 20, wherein the moving part (2) includes a back cushion (19).

- 25) The device according to claim 20, wherein the moving part (2) includes a saddle (20).
- 26) The device according to claim 20, wherein the moving part (2) includes a seat (21).
- 27) The device according to claim 21, wherein the platform (16) is interconnected with a structure of an exercise apparatus which receives a muscular force statically exerted by the user.
- 28) The device according to claim 22, wherein the surface (17) is included in an exercise apparatus with a sliding belt (22) on which the user exercises with a walking movement.
- 29) The device according to any of the claims from 1 to 19, wherein the moving part (2) includes an actuating element, to which the user applies a muscular force generated with his or her limbs.
- 30) The device according to claim 29, wherein the actuating element includes a handle (23) which can be used by the user.

- 31) The device according to any of the claims from 1 to 19, wherein the moving part (2) and the support member (3) are operatively connected to at least one weight (25) designed to generate a reaction to a driving action applied by the user.